

Revision of the soil-weevil genus *Guineobius* Osella from New Guinea (Coleoptera, Curculionoidea, Entiminae, Celeuthetini)*

Alexander RIEDEL & Klaus SCHÖNITZER

Zoologische Staatssammlung, Münchhausenstraße 21, D-81247 München, Germany.

Revision of the soil-weevil genus *Guineobius* Osella from New Guinea (Coleoptera, Curculionoidea, Entiminae, Celeuthetini). - Four new species of the entimine soil-weevil genus *Guineobius* Osella (*G. niger* Riedel, *G. minutus* Riedel, *G. depressus* Riedel, *G. baliemensis* Riedel) are described from the highlands of Irian Jaya. This is the first record of this genus for the western part of New Guinea. The two formerly known species of this genus from Papua New Guinea are redescribed. A key is given to all species and the phylogenetic significance of characters is discussed. The relative length of abdominal sternites proved to be highly variable within the genus. The possession of modified scales in most species is suggested as an apomorphic character for *Guineobius* Osella. Notes are given on ecology and conservation.

Key-words: Coleoptera - Curculionoidea - New Guinea - Taxonomy.

INTRODUCTION

Knowledge of the soil-weevil fauna of New Guinea perfectly reflects the recent exploration of this island in other scientific and cultural fields. No endogean weevil was known from New Guinea when OSELLA (1983) described the genus *Guineobius* based upon two species, one of them known from a unique specimen, the other known from two specimens only. Since then there are no further records. However, this is not surprising, since most of the highland areas became accessible only 20–30 years ago and the few collectors who have visited this region since, resorted mainly to standard collecting techniques such as beating and sweeping. Sieving the ground litter, the usual way to obtain endogean weevils was usually neglected.

On a series of his own expeditions to New Guinea beginning in 1990 the senior author repeatedly visited one locality on the eastern slopes of the Baliem valley

* Results of the entomological explorations of A. Riedel in New Guinea in 1990–1993. Manuscript accepted 02.04.1995.

(Irian Jaya) which resulted in the discovery of three additional species there. One more species was found in the Nalca region. These four new species are described below and their phylogeny and ecology are discussed.

MEASUREMENTS

Since the eyes in *Guineobius* are reduced or completely absent, the length of the rostrum was not measured from the anterior margin of the eyes as is usual in most Curculionoidea, but from the transverse furrow at the base of the rostrum. The breadth of the rostrum was measured between the pterygia. The width of the elytra was measured across both elytra at their widest point.

CHARACTERS

When OSELLA (1983) described the genus he defined it mainly on the loss of eyes, the ferruginous coloration, the strong punctation of the pronotum and the morphology of the abdomen (more or less straight suture between sternites III and IV; and sternites V and VI subequal in length). Since characters associated with the soil-dwelling habit, namely loss of eyes and ferruginous coloration are prone to convergence, we were looking for better evidence to prove the monophyly of the genus *Guineobius*. This was especially important since we discovered striking differences of the relative lengths of abdominal sternites, which made at first a polyphyly appear possible.

Modified scales of asymmetrical radiate pectinate shape are interpreted as apomorphy for *Guineobius* (Figs. 1–3). They are often found in dense patches or rows, especially on the ventral surface and are usually encrusted with dirt. The function of these scales is unknown. They are similar to some scales described by PAULAY (1985) in the genus *Miocalles* of Cryptorhynchinae, but we have not found such scales in any other genus of Celeuthetini. There are two species of *Guineobius* (*G. minutus* sp. n., *G. viduus* Osella) which lack these scales but this can be explained by secondary loss (see Phylogeny).

The variability of the abdomen (Figs 16–21) is astonishing. The two extreme types would probably lead a taxonomist to describe two different genera if the intermediate forms were unknown. It must be noted that in *Guineobius* the length ratios between abdominal sternites are identical in both sexes. In other genera of Celeuthetini such as *Stereogastrus* and *Piezonotus* some abdominal sternites are enlarged in females only.

An interesting genital character of various genera of Celeuthetini which is also present in at least two species of *Guineobius* is a partial eversion of the median part of the endophallus (Fig. 22). This is not an incomplete re-inversion but obviously the normal state since the walls of this part of the endophallus part are partially sclerotized. In *Guineobius* this character is most conspicuous in *G. niger*, but it is present in *G. minutus* as well. We have found it also in another probably undescribed genus of Celeuthetini. Sharp (1918) mentions in a "*Trigonops*, or *Heteroglymma* sp. n.?" from New Guinea a "structure which has all the appearance of being a tube"

inside the median lobe and we believe it is the same character described above. Since the species mentioned above do not seem to be closely related in other respects the character of the secondary tube seems to be an ancient one in the evolution of Celeuthetini.

The length of the flagellum seems to be highly variable within the tribe Celeuthetini. Within *Guineobius* two forms occur: one is short and simply curved, the other long, thread-like and spiral. The long form is probably a character reversal in *Guineobius* (see also Phylogeny). According to THOMPSON (1977) both short and long flagella also occur in the genus *Apirocalus*.

Guineobius Osella

Type-species: *Guineobius viduus* Osella, 1983, by original designation.

REDESCRIPTION:

Length. Small, pronotum plus elytron: 1.59–2.78 mm.

Rostrum with apical declivity evenly, not abruptly sloping, subglabrous, with several long setae; dorsally separated from head by more or less distinct transverse furrow which curves laterally apicad towards antennal scrobes.

Head with apical portion merging with rostrum; eyes lacking or small (not larger than last funicular article), smooth, without visible facets; if present eyes placed on anterior portion of head in front of level of median part of transverse furrow but ventral to forward curving lateral parts of transverse furrow (Figs 10, 13–15).

Antennae with scape passing anterior margin of pronotum in repose, setose, and more or less granulate; funicle with article 1 about 2X as long as broad apically, 2 shorter than 1, 3–7 subequal in length, ca. as long as broad.

Elytra smooth; striae punctures deeply impressed; humeri and scutellum lacking.

Metasternum short, shorter than diameter of mesocoxa.

Abdomen with intercoxal process broad, 1.5–1.8X wider than metacoxae.

Legs with ventral surface of tarsi with long curved suberect setae, claws stout.

Vestiture generally lacking except most punctures (especially on elytra) bearing single seta and except modified scales, often condensed in patches on head or on thoracic and abdominal venter.

KEY TO THE SPECIES OF *Guineobius*

- 1 Body large (pronotum plus elytron 2.4–2.8 mm), black; sternites V–VI short, equal in length (Fig. 16). *niger* sp. n.
- Body small (pronotum plus elytron 1.6–2.3 mm), ferruginous; sternites V–VI longer, subequal or unequal in length (Figs 17–21). 2
- 2 Sternites V and VI subequal in length with sternite VI slightly longer; suture between sternites III–IV entirely absent (Figs 17–18). 3

- Sternites V and VI slightly to strongly unequal in length with fifth sternite 2X–3X longer than sternite VI; suture between sternites III–IV distinct at least laterally (Figs 19–21). 4
- 3 Rostrum above with transverse basal band of scales, head smooth (Fig. 11). *deharvengei* Osella
- Rostrum lacking transverse basal band of scales, head punctate (Fig. 12). *viduus* Osella
- 4 Fifth sternite 2.0X longer than sternite VI (Fig. 19); body size small, pronotum plus elytron 1.6 mm. *minutus* sp. n.
- Fifth sternite 2.8X–3.1X longer than sternite VI (Figs 20–21); body size larger, pronotum plus elytron 1.9–2.3 mm. 5
- 5 Base of rostrum ventrally with round patch of scales; body elongate, flattened (Fig. 8); head smooth (Fig. 14). *depressus* sp. n.
- Base of rostrum ventrally with glabrous pit; body not strikingly elongate or flattened (Fig. 9); head punctate (Fig. 15). *baliemensis* sp. n.

Guineobius niger Riedel, sp. n.

(Figs 1–4, 10, 16, 23, 28, 33)

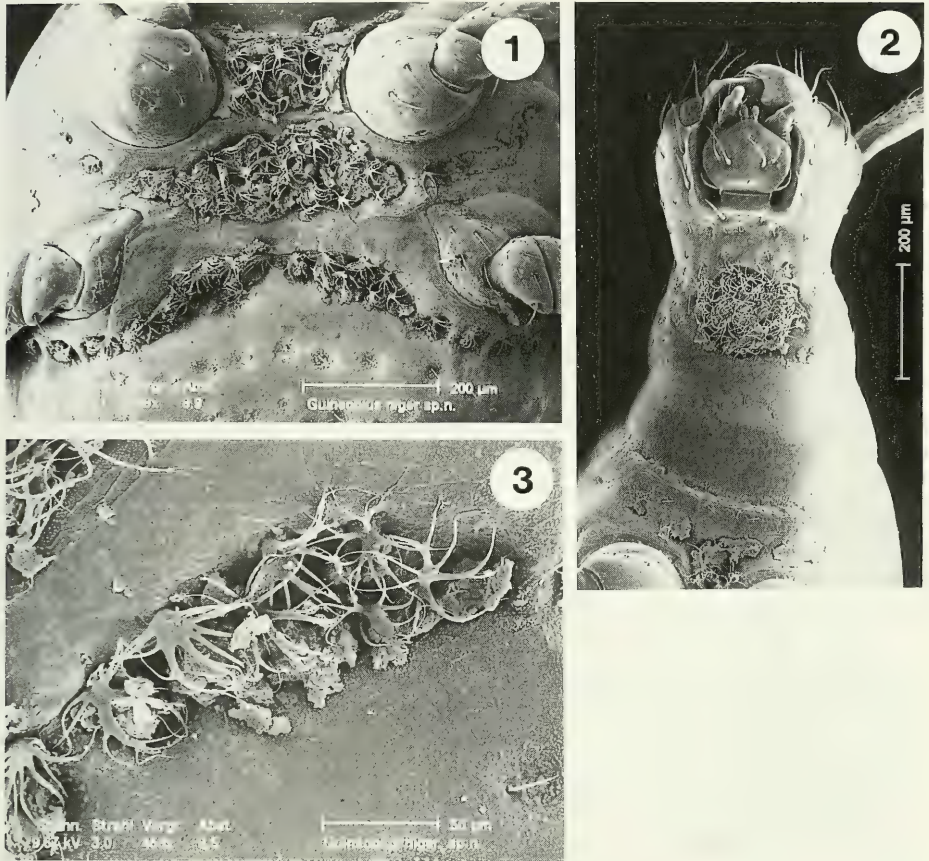
MATERIAL EXAMINED: Holotype: Irian Jaya, Jayawijaya-Province, Wamena, Jiwika; 1900–2000 m, 23.IX.1992, leg. A. Riedel. Paratypes: Irian Jaya, Jayawijaya-Province, Wamena, Jiwika, ca. 1700–2300 m, 2.IX.1991, leg. A. Riedel (4); 1700–2000 m, 11.IX.1991, leg. A. Riedel (2 and allotype); 1900–2050 m, 24.X.1993, leg. A. Riedel (15); as holotype (28, 1 coated for SEM).

Holotype and allotype deposited in the Zoologische Staatssammlung (München). Paratypes deposited in collections A. Riedel (München), G. Osella (L'Aquila), C.W. O'Brien (Tallahassee) and Muséum d'histoire naturelle (Geneva).

DIAGNOSIS: Large, black; base of rostrum ventrally with round patch of scales, center of metasternum densely squamose; sternites V–VI short, equal in length.

DESCRIPTION:

Holotype, male. Length. Pronotum plus elytron: 2.78 mm. Rostrum 1.36X longer than broad, in dorsal view lateral margins roundly diverging to antennal insertion, there rostrum much broader than at base; furrow separating dorsal part of rostrum partly merging with antennal scrobes anteriorly, laterally strongly impressed, posteriorly shallow and medially weakly impressed; declivital area in front of antennal scrobes moderately long; parts of scrobes in front of antennal insertion short, at antennal insertion curved inwards, converging obliquely in straight line, posteriorly open; dorsum between scrobes narrowing posteriad, almost flat, but slightly elevated medially in anterior portion, with long setae arranged in form of anteriorly open V; dorsum in posterior 1/2 of rostrum narrow, narrower than length of article 2 of funicle; behind with shallow, indistinct median furrow and punctate; sides of dorsum steeply concavely sloping; in lateral view straight in basal 1/2, dorsal and ventral margins parallel; at level of antennal insertion broader, curved ventrad; ventrally with large round patch of modified scales; with setiferous punctures.



FIGS 1-3

Guineobius niger sp. n., modified scales (SEM). (1) ventral aspect of mesothorax, metathorax and sternite III with squamose patches; (2) ventral aspect of head with squamose patch at base of rostrum; (3) modified scales with dirt incrustations. Scale bars: (1-2) 0.2 mm; (3) 0.05 mm.

Head with basal part globose, smooth; vestigial eyes as large as last funicular article, located dorsolaterally on ovate elevated punctate lobes reaching from rostrum onto smooth part of head. Antennae. Funicle with article 1 conical; 2 elongate, 1.7X longer than 3; club with basal half conical, apical half broadly rounded, apical 1/3 more densely setose.

Prothorax slightly (1.09X) longer than broad, side margins strongly rounded; disc strongly punctate with large punctures, distance apart greater than their diameter; sides with widely scattered, smaller punctures; basally constricted, constriction densely squamose, medially strongly rounded, apically gradually narrowing dorsally. Elytra elongate-ovate, 1.37X longer than broad, broadest at basal 1/4, then subparallel

to apical 1/4; deeply punctate, setae minute, punctures separated by length of their diameter; with 10 regular striae; stria 8 shortened at base, beginning at level of metacoxa. Prosternum. Coxae separated by 0.20X coxal diameter; densely squamose behind coxae; with anterior apical constriction; with deep posterior impression between coxae. Mesosternum with intercoxal process densely squamose, coxae separated by 0.92X coxal diameter. Metasternum medially densely squamose, laterally subglabrous with row of squamiferous punctures bordering mesocoxae.

Abdomen. Sternites III and IV subequal in length, suture between fine but distinct, slightly sinuate medially; sternite III with deep, sinuate impression bordering front-margin of intercoxal process, with row of squamiferous punctures continuing to elytral margin; remainder of sternites III and IV smooth, shallowly punctate, medially concave; sternites V and VI equal, narrow, together 1/2 as long as sternite IV; sternite VII half-rotund, longer than sternites V and VI together, punctate. Legs. Tarsi with tarsomere 3 long, ventrally deeply bilobed, tarsal articulation at posterior 1/2. Coloration of cuticle black, with slightly bluish, oily shine.

Genitalia. Median lobe much shorter (0.47X) than apodemes, stout, in lateral view weakly curved from base to apex, in dorsal view apex evenly rounded. Endophallus with distinct partial median eversion, here membrane sclerotized in part; apical half curved forward to base of median lobe, with minute spines; flagellum 0.54X as long as median lobe.

Allotype, female. Same as male except: Length. Pronotum plus elytron 2.78 mm. Prothorax with side margins slightly less strongly rounded. Abdomen with sternites III and IV convex.

Genitalia. Spermatheca with distinct ramus; extended at insertion of spermathecal duct; insertion of spermathecal duct and of spermathecal gland well-separated; body apically bent inward and much thinner than at base.

Intraspecific variation: Length. Pronotum plus elytron 2.41–2.78 mm. Coloration from yellowish brown in one teneral specimen to piceous and completely black, with bluish shine in most specimens. Prothorax. Punctuation varying from denser (diameter of punctures larger than interspaces between punctures) and deeper to sparser (diameter of punctures smaller than interspaces between punctures) and shallower.

Etymological Note: This epithet is based on the Latin adjective *niger* (black, dark) and refers to the black coloration in mature specimens.

Guineobius deharvengei Osella 1983

(Figs 5, 11, 17, 24, 33)

Guineobius deharvengei Osella, 1983: 115.

MATERIAL EXAMINED: Holotype, female, Papua New Guinea, Port Moresby, Rauna Falls, 5.XI.1978, leg. Deharveng. Deposited in Muséum d'histoire naturelle (Geneva).

DIAGNOSIS: With transverse band of scales dorsally at base of rostrum; dorsum of rostrum between antennal scrobes with sides converging posteriad in straight line; head impunctate; sternite VI longer than sternite V, suture between sternites III and IV entirely effaced.



FIGS 4-9

Habitus, dorsal: (4) *Guineobius niger* sp. n., paratype, length of pronotum plus elytron 2.65 mm; (5) *G. deharvengei* Osella, holotype, length of pronotum plus elytron 1.82 mm; (6) *G. viduus* Osella, holotype, length of pronotum plus elytron 1.80 mm; (7) *G. minutus* sp. n., holotype, length of pronotum plus elytron 1.59 mm; (8) *G. depressus* sp. n., holotype, length of pronotum plus elytron 2.34 mm; (9) *G. baliemensis* sp. n., allotype, length of pronotum plus elytron 1.94 mm.

REDESCRIPTION:

Holotype, male. Length. Pronotum plus elytron: 1.82 mm.

Rostrum as long as broad, lateral margins subparallel in dorsal view; transverse furrow separating dorsal part of rostrum medially broadly deeply impressed, laterally finer, ending below antennal scrobes, throughout partly hidden by ring of

modified scales; declivital area in front of antennal scrobe moderately short; antennal scrobes S-shaped, in front of antennal insertion narrow, curved inward, posteriorly broad, converging slightly sinuate in almost straight line, posteriorly open; dorsum between scrobes narrowing with straight margins posteriad, behind separated by 1.67X length of funicular article 2, posteriad scrobes widening, but very short; dorsum smooth except median furrow in posterior 1/2 and few punctures and setae anteriorly; in lateral view straight, tapering apicad, ventral margin straight, dorsal margin sloping down roundly; base dorsally with transverse dense band of modified scales, keeping posteriad antennal scrobes, laterally tapering; in the holotype band asymmetrical, reaching further ventrad on right side; ventrally subglabrous, with few long setae; postmentum triangularly elevated.

Head globose, smooth, shining. Antennae. Funicle with article 2 short, 1.2X longer article 3; club pointed apicad, evenly setose.

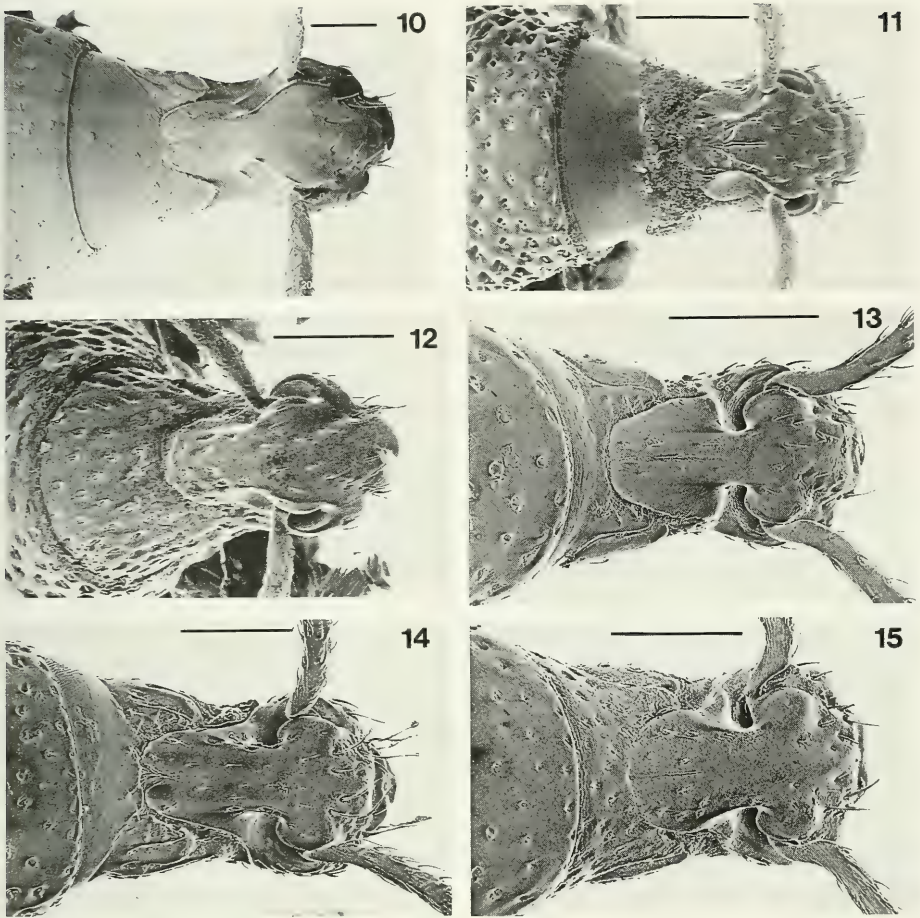
Prothorax almost (1.07X longer) as long as broad, side margins strongly rounded; disc deeply punctate, diameter of punctures larger than their distance, punctures with suberect setae; laterally with same sculpture; with squamose basal constriction. Elytra elongate, 1.59X longer than broad, broadest about middle, evenly curved from base to apex, setae moderately long; stria 8 shortened at base, beginning at level of metacoxa. Prosternum glabrous, punctate with distinct preapical constriction; coxae separated by 0.56X coxal diameter. Mesosternum with coxae separated by 1.67X coxal diameter. Metasternum especially on sides deeply punctate, subglabrous, with scattered setae.

Abdomen glabrous, sternites III-IV densely shallowly punctate, medially shallowly depressed, suture between sternite III and IV completely effaced; sternite V narrow, sternite VI broad, 1.42X longer sternite V; sternite VII 1.27X longer sternites V and VI together, apically broadly rounded. Legs. Tarsi with tarsomere 3 short, broad, deeply bilobed. Coloration of cuticle light ferruginous, head and prothorax little darker.

Genitalia: Spermatheca crescent-shaped, extended at insertion of spermathecal duct; insertion of spermathecal duct not clearly visible in allotype, but probably well separated from insertion of duct; body tapering apicad, outer margin evenly curved.

Remarks: The most distinct character of this species, a transverse dorsal band of modified scales at the base of the rostrum is not a complete ring as OSELLA described it. Ventrally there were only dirt-accrustations faking easily scale-covering, but they could easily be removed with warm water.

Etymological Note: This species was named in honour of Mr. Deharveng. If it was formed from this modern name the spelling would have to be *deharvengi*. It is spelled this way on the label of the holotype. However, in the original publication OSELLA has used the name *deharvengei*. This has to be taken as the genitive of the latinized name *deharvengesus*. Usually the latinization of a male personal name is formed by adding the ending -ius, but the ending -eus is valid as well. Thus the name *deharvengei* is a correct original spelling although a little unusual.



FIGS 10-15

Head, dorsal (SEM). (10) *G. niger* sp. n., paratype; (11) *G. deharvengei* Osella, holotype; (12) *G. viduus* Osella, holotype; (13) *G. minutus* sp. n., holotype; (14) *G. depressus* sp. n., holotype; (15) *G. baliemensis* sp. n., allotype. Scale bars: 0.2 mm.

Guineobius viduus Osella 1983

(Figs 6, 12, 18, 29, 33)

Guineobius viduus Osella, 1983: 114.

MATERIAL EXAMINED: Holotype, male, Papua New Guinea, Chiumbu, Chuave, 22.XI.1978, leg. Deharveng. Deposited in Muséum d'histoire naturelle (Geneva).

DIAGNOSIS: Devoid of scales; head strongly punctate; sternite VI longer than sternite V, suture between sternites III and IV entirely effaced.

REDESCRIPTION:

Length. Pronotum plus elytron: 1.80 mm. Rostrum 1.17X longer than broad, in dorsal view lateral margins slightly evenly roundly diverging apicad; furrow separating dorsal part of rostrum deeply impressed throughout, anteriorly ending below antennal scrobes; declivital area in front of antennal scrobe moderately short; antennal scrobes intermediate between S- and kidney-shaped form, posteriorly opposing each other at blunt angle, separated by 1.25X length of funicular article 2; dorsum anteriorly between antennal scrobes widening posteriad, then sinuately narrowing posteriad, posteriorly antennal scrobes parallel-sided, moderately broad, curved; dorsum in apical part medially elevated, elevation surrounded by long setae arranged in form of anteriorly open V; in lateral view straight, ventral margin straight, dorsal margin convex; laterally with setiferous punctures, sculpture confluent with head; ventrally at base with scattered non-modified suberect scales.

Head flat, above densely deeply punctate; ventrally smooth, glabrous. Antennae. Funicle with article 2 short, 1.3X longer article 3, stalked, basal 1/2 narrow and parallel-sided; club ovate, apically weakly pointed and denser setose.

Prothorax 1.15X longer than broad, side margins rounded; disc deeply punctate, laterally diameter of punctures larger than their distance, medially their distance larger and partly impunctate; on sides punctation denser; base without constriction. Elytra elongate, 1.63X longer than broad, broadest about middle, evenly curved from base to shortly before apex, then slightly sinuate; setae moderately long. Prosternum glabrous, punctate, preapical constriction indistinct; coxae separated by 0.50X coxal diameter; striae 6 and 7 shortened at base, beginning at level of metacoxa. Mesosternum with coxae separated by 1.21X coxal diameter. Metasternum subglabrous, with few setae.

Abdomen glabrous, sternites III and IV laterally punctate, medially deeply impressed and smooth; suture between sternites III and IV medially completely effaced, laterally with trace of suture; sternites V and VI broad, subequal, sternite VI 1.1X longer sternite V; sternite VII 1.1X longer sternites V and VI together, apically rounded. Legs. Tarsi with tarsomere 3 short, broad, deeply bilobed. Coloration of cuticle light ferruginous, head and prothorax little darker.

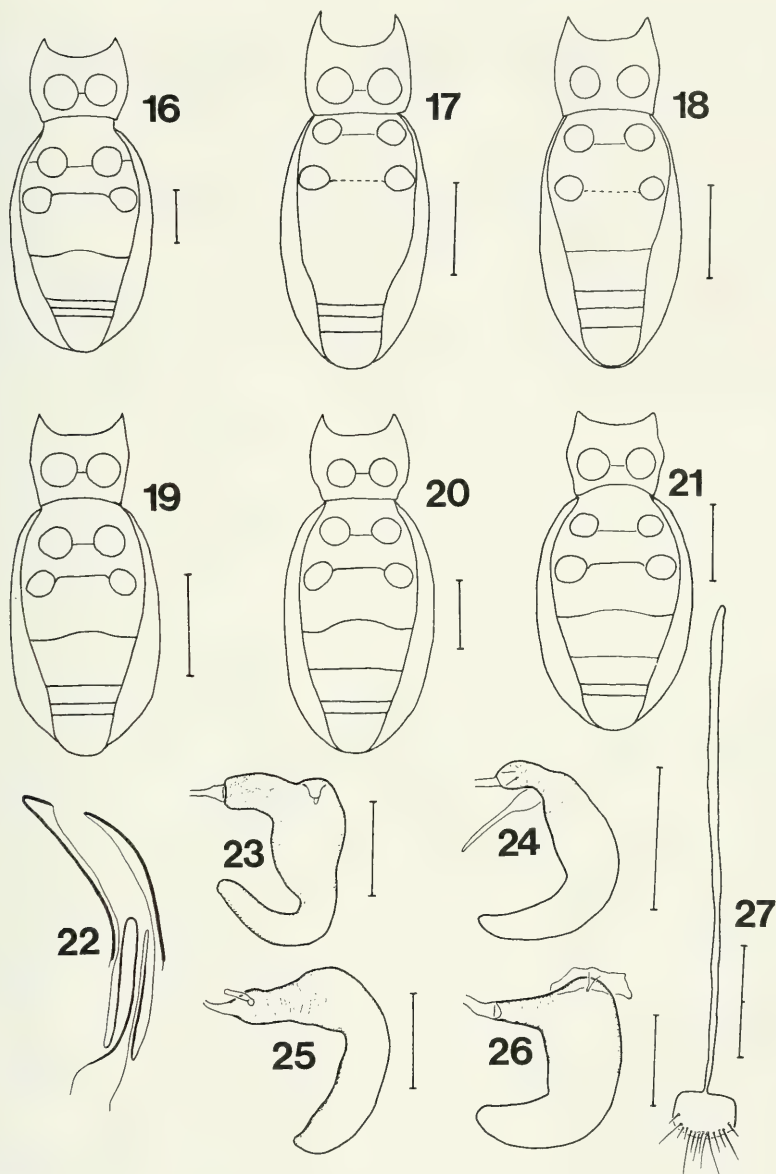
Genitalia. Median lobe slightly shorter (0.91X) than apodemes, in lateral view strongly curved in basal 1/4, in dorsal view apex produced into pointed apical lip. Endo-phallus without visible partial median eversion, inside median lobe with minute spines, without distinct sclerites; outside median lobe first bent apicad, then bent basad resulting in Z-shaped form; flagellum 0.35X as long as median lobe.

Guineobius minutus Riedel, sp. n.

(Figs 7, 13, 19, 30, 33)

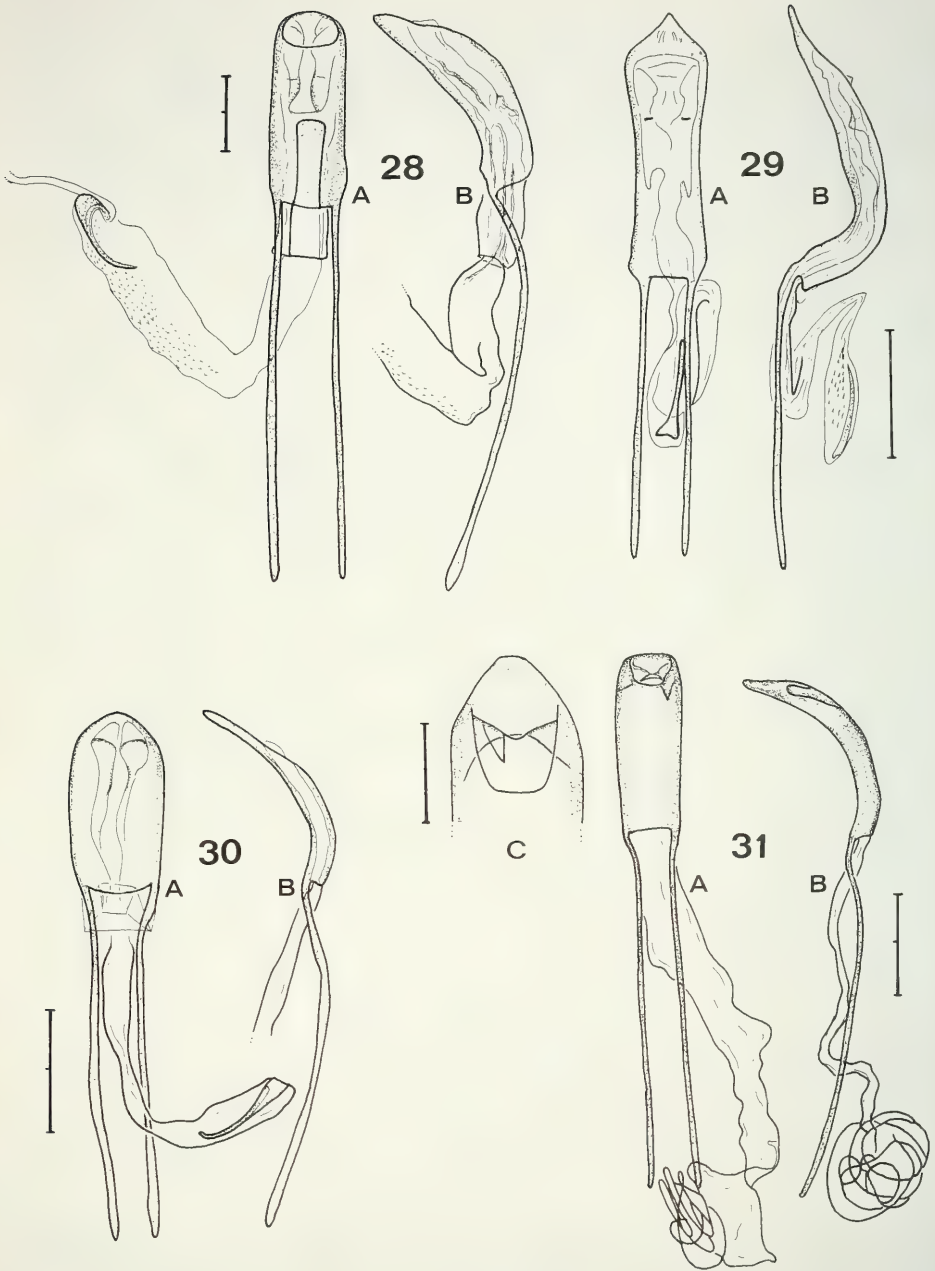
MATERIAL EXAMINED: Holotype: Irian Jaya, Jayawijaya-Province, Diuremna near Nalca, 1900–2100 m, 9–11.IX.1992, leg. A. Riedel. Left hind leg missing.

Holotype deposited in the Zoologische Staatssammlung (München).



FIGS 16-27

(16-21) ventral aspect of thorax and abdomen; (16) *G. niger* sp. n.; (17) *G. deharvengei* Osella; (18) *G. viduus* Osella; (19) *G. minutus* sp. n.; (20) *G. depressus* sp. n.; (21) *G. baliemensis* sp. n.; (22) *G. niger* sp. n., aedeagus, schematic longitudinal section; (23-26) spermatheca; (23) *G. niger* sp. n., allotype; (24) *G. deharvengei* Osella; (25) *G. depressus*, holotype; (26) *G. baliemensis* n. sp., allotype; (27) *G. depressus* sp. n., holotype, sternite VIII. Scale bars: (16-21) 0.5 mm; (23-26) 0.1 mm; (27) 0.2 mm.



FIGS 28–31

Male genitalia: aedeagus in dorsal (A) and lateral (B) aspect. (28) *G. niger* sp. n., holotype; (29) *G. viduus* Osella, holotype; (30) *G. minutus* sp. n., holotype; (31) *G. baliemensis* sp. n., holotype; (31c) apical aspect. Scale bars: (28–31B) 0.2 mm; (31C) 0.1 mm.

DIAGNOSIS: Small; without modified scales; posterior half of rostral dorsum narrow, ridge-shaped; deep punctures of elytra each with long suberect seta; sternite VI 1/2 as long as sternite V.

DESCRIPTION:

Holotype, male. Length. Pronotum plus elytron: 1.59 mm. Rostrum 1.49X longer than broad, in dorsal view lateral margins subparallel from base to apex; furrow separating dorsal part of rostrum anteriorly ending where antennal scrobes bent inwards, shallow but distinct throughout; dorsum of rostrum extending tongue-like far behind on head; declivital area in front of antennal scrobes long; antennal scrobes kidney-shaped in dorsal view, posterior 1/2 strongly bent inward, scrobes opposing each other at blunt angle, separated by dorsum equal to length of funicular article 2; dorsum between antennal scrobes subquadrate, flat, with relatively short setae, irregularly arranged in form of anteriorly open V; dorsum in posterior half of rostrum extremely narrow, ridge-shaped, but with distinct median furrow; sides of dorsum smoothly sloping, glabrous, shining; round lobes stretching backwards onto smooth head including together with posteriorly produced dorsum cuneiform process of head bearing setae directed medially and tiny vestiges of eye in the anterior corner; in lateral view parallel basally, tapering apicad; ventrally obliquely wrinkled, subglabrous, with few erect setae; medially with small pit, but without modified scales.

Head smooth and shining. Antennae. Funicle with second article 1.6X longer article 3; club ovate, apex weakly pointed, apex denser setose than base. Prothorax elongate, side margins rounded, 1.13X longer than broad; except along mid-line densely punctate with large punctures, their diameter larger than their distance, each puncture bearing long suberect seta; with narrow glabrous basal constriction. Elytra elongate, at base weakly rounded, broadest behind middle, in apical 1/5 strongly and broadly rounded to apex; stria punctures large, deep, bearing long erect seta subequal in length to diameter of puncture; stria 6 shortened at base, beginning at level of metacoxa; stria 7 complete; stria 8 shortened, beginning behind level of metacoxa; stria 10 pressed to elytral margin.

Prosternum with preapical constriction, glabrous, punctate, coxae separated by 0.29X coxal diameter. Mesosternum glabrous, punctate with deep large punctures, coxae separated 0.73X coxal diameter. Metasternum glabrous, punctate.

Abdomen glabrous, punctate; front- and hind-margin of sternite III bordered by a row of punctures; sternites III and IV subequal in length, suture between distinct throughout, medially sinuate; sternites V and VI together shorter (0.76) than sternite IV; sternite VI half as long as sternite V; sternite VII slightly longer (1.1X) than sternite V and VI together, broadly rounded apically. Legs. Tarsi with tarsomere 3 short, subquadrate, apex ventrally sinuate, cavity for articulation of tarsomere 5 occupying greatest part. Coloration of cuticle ferruginous.

Genitalia. Median lobe much shorter (0.54X) than apodemes, dorsoventrally flattened, in lateral view weakly curved from base to apex, in dorsal view apex bluntly pointed. Endophallus with short median partial eversion, without distinct

sclerites, without minute spines; apex curved apicad towards base of median lobe, without distinct sclerites; flagellum 0.62X shorter median lobe.

Etymological Note: This epithet is based on the Latin adjective *minutus* (small, tiny) and refers to the small size of this species.

Guineobius depressus Riedel sp. n.

(Figs 8, 14, 20, 25, 27, 33)

MATERIAL EXAMINED: Holotype: Irian Jaya, Jayawijaya-Province, Wamena, Jiwika; 1900–2000 m, 23.IX.1992, leg. A. Riedel

Holotype deposited in the Zoologische Staatssammlung (München).

DIAGNOSIS: Body flattened; rostrum ventrally with round patch of modified scales; sternite V much longer (3.07X) than sternite VI;

DESCRIPTION:

Holotype, female. Length. Pronotum plus elytron: 2.34 mm. Rostrum 1.43X longer than broad; in dorsal view lateral margins subparallel from base to apex; furrow separating dorsal part of rostrum anteriorly ending below antennal scrobes, laterally well impressed, posteriorly less distinct; declivital area in front of antennal scrobes short; antennal scrobes kidney-shaped in dorsal view, opposing each other in almost straight line, scrobes there separated by dorsum broader (1.2X) length of funicular article 2, posterolateral margin not sharply delimited; dorsum between scrobes subquadrate, flat, with long irregularly arranged setae; dorsum in posterior half of rostrum broad, broader than funicular article 2 long, with flat, broad median sulcus, sides of dorsum steeply sloping; in lateral view rostrum curved, dorsal and ventral margins parallel; laterally shining with setiferous punctures; behind vestige of eye wrinkly sculptured; ventrally with round patch of modified scales.

Head smooth. Antennae. Funicle stout, second article 1.7X longer article 3, articles 3–7 parallel-sided; club ovate, apex weakly pointed, evenly densely setose except extreme base subglabrous.

Prothorax slightly longer (1.11X) than broad, side margins moderately rounded, disc convex, strongly punctate with large punctures, their distance smaller than their diameter; sides denser punctate than disc; basal part constricted, separating cylindrical, ventrally and laterally densely squamose basal part narrowing dorsally, there medially glabrous; Elytra elongate, 1.46X longer than broad, at shoulders evenly rounded, then subparallel till rounded at apex; dorsoventrally depressed; striae punctures small, laterally punctures bearing short erect seta, medially glabrous; striae 7–8 shortened at base, beginning at level of metacoxa. Prosternum. Coxae separated 0.63X coxal diameter; with preapical constriction; behind constriction to hind margin densely covered with modified scales. Mesosternum. Coxae separated by 1.1X coxal diameter; margin of intercoxal process with modified scales. Metasternum. Center glabrous, shining, punctate; sides and margin of mesocoxae punctate, punctures with sparse modified scales.

Abdomen. Sternites III and IV subequal in length, suture between distinct throughout and strongly sinuate; sternite III with a row of deep, squamiferous punctures

bordering front margin of intercoxal process; rest of abdomen glabrous, shining, sparsely shallowly punctate; sternite V and VI together almost (0.88X) as long as sternite IV; fifth sternite 3.07X longer than sternite VI; sternite VII shorter (0.83) than sternites V and VI together, broadly rounded apically. Legs. Tarsi with tarsomere 3 moderately long, narrow, apex deeply bilobed. Coloration of cuticle ferruginous.

Genitalia. Spermatheca robust, with weak ramus; extended at insertion of spermathecal duct; insertion of spermathecal duct and spermathecal gland well-separated; body weakly tapering apicad, apical 1/2 in right angle bent inward.

Etymological Note: This epithet is based on the participle of the Latin verb *deprimere* (flatten) and refers to the dorsoventrally flattened body-shape.

Remarks: Unfortunately this species is known only from a unique female. However it can be clearly separated from the other known species and the male genitalia are not of such crucial importance in this genus as in some other groups of Curculionioidea. Therefore we consider it beneficial to provide a name for this species here as well.

***Guineobius baliemensis* Riedel, sp. n.**

(Figs 9, 15, 21, 26, 31, 33)

MATERIAL EXAMINED: Holotype: Irian Jaya, Jayawijaya-Province, Wamena, Jiwika; 1900–2050 m, Winkler-ecclector, 24.X.1993, leg. A. Riedel. Paratypes: as holotype (2); Irian Jaya, Jayawijaya-Province, Wamena, Jiwika, 1900–2050 m, 24.X.1993, leg. A. Riedel (allotype).

Holotype and allotype in collection A. Riedel (München), deposited on indeterminate loan in the Zoologische Staatssammlung (München). Paratypes deposited in collection A. Riedel (München).

DIAGNOSIS: Rostrum ventrally at base with glabrous pit; head punctate; prosternum with coxae widely (0.6X their diameter) separate, deeply impressed, with modified scales; sternite V much longer (2.8X) than sternite VI.

DESCRIPTION:

Holotype, male. Length. Pronotum plus elytron: 1.60 mm. Rostrum 1.30X longer than broad, in dorsal view lateral margins subparallel from base to apex; furrow separating dorsal part of rostrum anteriorly ending below antennal scrobes, its anterior 1/2 broadly and well impressed, behind shallow and almost effaced; declivital area in front of antennal scrobes long; scrobes evenly kidney-shaped in dorsal view, well delimited, posteriorly separated by dorsum broader (1.4X) length of funicular article 2; dorsum between antennal scrobes subquadrate, subglabrous with few setae; dorsum in posterior half of rostrum broad, broader than funicular article 2 long; sides of dorsum smoothly convexly sloping; in lateral view weakly tapering apicad, ventral margin straight, dorsal margin weakly curved; laterally mat, sparsely shallowly punctate, setose; with vestige of eye; lateral lobes weakly developed; ventrally behind with deep median elongate glabrous pit, laterally with sparse modified scales.

Head punctate. Antennae. Funicle with article 2 elongate, subequal in length to article 1, 1.8X longer article 3; articles 3–7 subequal, about as long as broad; club ovate, apical 1/2 denser setose than base.

Prothorax slightly longer (1.13X) than broad, side margins weakly rounded, densely punctate but medially distance between punctures longer than diameter; basal constriction narrow, glabrous. Elytra ovate, 1.40X longer than broad; strial punctures large, deep, on declivity shallow; with 10 regular striae; striae 7 and 8 shortened, beginning at level of metacoxa; laterally punctures each with short erect seta, medially glabrous. Prosternum. Coxae widely separated by 0.6X coxal diameter; area between coxae cavernous, with scattered modified scales; without preapical constriction. Mesosternum with intercoxal process sparsely squamose, coxae separated by 1.15X diameter, suture with metasternum distinct. Metasternum glabrous, punctate. Abdomen glabrous, center sparsely, shallowly punctate; anterior margin of sternite III with row of deeper punctures; sternites III and IV medially with broad impression; sternites III–IV subequal in length, suture between medially obsolete, laterally weak; sternites V–VI together equal in length to sternite IV; sternite V little shorter (0.75) sternite IV, 2.8X longer than sternite VI; sternite VII shorter (0.85X) than sternite V and VI together, broadly rounded apically. Legs. Tarsi with tarsomere 3 moderately long, apex deeply bilobed. Coloration of cuticle ferruginous.

Genitalia. Median lobe much shorter (0.53X) than apodemes, in lateral view strongly curved, moderately flattened dorsoventrally, in dorsal view apex with straight sides angulately pointed, behind orifical area internally with sclerites. Endophallus hyaline, without visible partial eversion, without minute spines, straight; flagellum long, thread-like, spiralized.

Allotype, female: same as holotype except: Length. Pronotum plus elytron: 1.94 mm. Rostrum 1.36X longer than broad; dorsum between antennal scrobes with few short, maybe broken setae, medially with flat broad ridge; dorsum in posterior half with median furrow. Prothorax densely punctate throughout, sometimes distance between punctures smaller than diameter. Elytra with stria 8 shortened. Mesosternum with coxae separated by 1.6X diameter.

Abdomen. Sternites III–V convex. Spermatheca without ramus, insertion of spermathecal gland approximate to insertion of spermathecal duct; body hardly tapering apicad, thinner at base than at apex; outer margin evenly curved except slightly concave near base.

Intraspecific variation. Prothorax. Area between procoxae more or less deeply impressed to cavernous.

Etymological Note: This epithet is based on the name of the Baliem-river-valley where the type locality is located.

SYSTEMATIC POSITION OF *Guineobius*

The only classification of Celeuthetini available is the revision by MARSHALL (1956). Although being of great value for taxonomic purposes it does not provide an appropriate basis for phylogenetic considerations. MARSHALL did not give a proper diagnosis of the tribe except differentiating it against Elytrurini. From his comments and from our observations the Celeuthetini *sensu* MARSHALL are likely a monophyletic group; the character of the transverse sulcus dorsally separating head from

rostrum would be the only autapomorphy available at present. However, it must be noted that some African Peritelini have a similar structure, so additional studies are required to confirm the significance of this character. Most genera of Celeuthetini have their rostrum abruptly declivous at the apex, but some genera including *Guineobius* have it evenly sloping apicad. We consider the first character state synapomorphic, the second one symplesiomorphic. Within the paraphyletic assemblage of genera having evenly sloping rostrum, the genera *Apirocalus*, *Hellerrhinus* and *Kokodanus* possess conspicuous spines on their elytral declivity and are thus considered to constitute another monophyletic group. Looking for a sister group of *Guineobius* we would have to consider following other groups in the analysis: All species with abrupt rostral declivity, the group of *Apirocalus* – *Hellerrhinus* – *Kokodanus* and each of the remaining (monotypic) genera with evenly sloping rostrum, namely *Acoptorrhynchus*, *Oedirrhynchus*, *Idorrhynchus* and *Pachyrrhynchidius*. Unfortunately the four latter genera are known to us from the description only. No characters were found to hint on the position of *Guineobius* among the above mentioned groups.

Another possible sister group of *Guineobius* was found in leaf litter in New Guinea. Two species were collected that should be placed in a new genus close to *Guineobius*, but for a formal description the material at hand is not sufficient.

The species have an apicad evenly sloping rostrum. Furthermore they possess in relation to *Guineobius*, plesiomorphic character states such as the small prominent eyes with few facettes and the squamose vestiture. The males have a long spiral flagellum. However, it must be admitted that no synapomorphy with *Guineobius* could be found except the mode of life in the leaf litter and the somewhat smaller eyes in relation to other Celeuthetini.

PHYLOGENY

Unfortunately four of the six species of *Guineobius* are known from only one sex which renders inclusion of genitalic characters into a cladistic analysis difficult. However, the genitalia possess characters that could be useful for such a purpose when additional material becomes available. By using the available characters a preliminary classification was obtained.

The polarity for all characters was determined by outgroup comparison. Generally the remainder of Celeuthetini was used as an outgroup. To decide the polarity of characters 3 and 5 where both states occur in the remainder of Celeuthetini it was necessary to use two yet undescribed species. These are also dwelling in the leaf-litter in New Guinea and probably represent a new genus of Celeuthetini which is presumably closely related to *Guineobius* (See "systematic position").

In the following character list numbers in brackets indicate the state of polarity; (0) is plesiomorphic, (1) is apomorphic and (2) more apomorphic.

1. Scales

- subovate and appressed or elongate and erect, but always with entire margins (0)
- asymmetrical radiate pectinate (1)
- entirely missing (2)

2. Body length

- large, pronotum plus elytron: 2.4–2.8 mm (0)
- small, pronotum plus elytron: 1.6–2.3 mm (1)

3. Antennal scrobes

- in dorsal view margins curved inwards, converging obliquely in straight line (0)
- in dorsal view margins kidney-shaped in dorsal view, opposing each other in an almost straight line (1)

4. Presence of eyes

- vestigial, but distinct (0)
- absent or vestiges extremely small (1)

5. Shape of elytra

- broad at base and apex, medially weakly rounded (0)
- relatively narrow, elongate, evenly rounded from base to apex (1)

6. Abdomen

- sternites V–VI equal or subequal with sternite VI slightly longer (0)
- sternite V at least 2X longer than sternite VI (1)
- sternite V ca. 3X longer than sternite VI (2)

7. Suture between sternites III–IV

- distinct (0)
- completely effaced, or at best only with lateral traces (1)

8. Cuticular coloration

- black (0)
- red-brown (1)

For discussion of characters 1 and 6 see under "Characters".

G. niger possesses most of the primitive traits, but whether it is really the sister-group to all remaining *Guineobius* appears somewhat doubtful. Characters 2, 4 and 8 connecting the two following clades are extremely prone to convergence as shown by numerous groups of subterranean Coleoptera having lost eyes and melanization. However, unless convergence can be demonstrated in this case, characters 2, 4 and 8 must be interpreted as synapomorphies.

Character 6 was treated as an ordered transformation series with a gradual elongation of sternite V. The state in *G. minutus* (intermediate length) is apomorphic to the state with a short sternite V, and the state in *G. depressus* and *G. baliemensis* with a long sternite V would be most apomorphic.

G. deharvengei and *G. depressus* are known from female specimens only. For that reason male genital characters could not be included in the analysis. Still, it may be noted that a long thread-like spiral flagellum occurs both in the outgroup-representatives and in *G. baliemensis*. A short simply curved flagellum is found in the remainder of *Guineobius*. According to our present hypothesis of *Guineobius*-relationships this character is a reversal of the derived state (short flagellum) to the formerly primitive one (spiral flagellum).

TABLE 1

Character state matrix for the species of *Guineobius*.

Character	1	2	3	4	5	6	7	8
<i>G. niger</i>	1	0	0	0	0	0	0	0
<i>G. deharvengi</i>	1	1	0	1	1	0	1	1
<i>G. viduus</i>	2	1	0	1	1	0	1	1
<i>G. minutus</i>	2	1	1	1	0	1	0	1
<i>G. depressus</i>	1	1	1	1	0	2	0	1
<i>G. baliemensis</i>	1	1	1	1	0	2	1	1

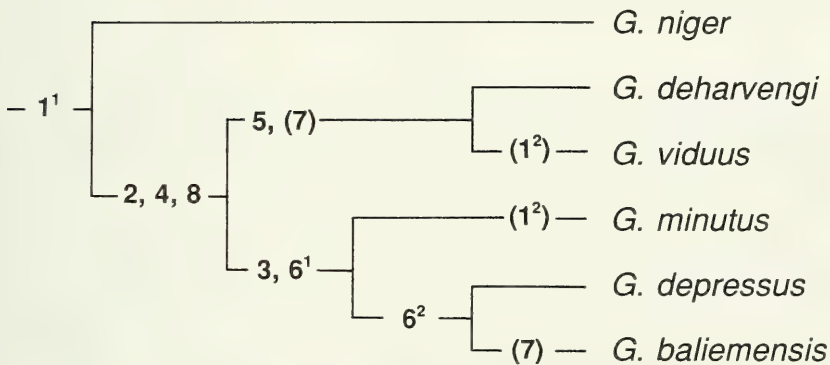


FIG. 32

Hypothesized relative relationships of *Guineobius*-species according to manual reconstruction. Numbers refer to table 1 and to character list in the text. Convergence in parenthesis.

ECOLOGY AND CONSERVATION

G. niger, *G. depressus* and *G. baliemensis* were collected by sieving ground-litter in a montane forest disturbed by human activity, but especially influenced by pigs from the nearby villages digging the ground in search for food. The forest was situated on sandy ground and unusually dry, but moist pockets were found for sieving. The area is located at an altitude of 1900–2050 m, samples taken at 2300 m did not contain *Guineobius*. It was found that *Guineobius*-species stay motionless for a long time, even in bright sunshine, and may easily be overlooked during hand-sampling. Sifted material that was searched in bright sunshine and that was completely dried out provided a surprising number of *Guineobius* when put into a Winkler-ecclector overnight. *G. minutus* was collected in a slightly disturbed forest that was moister than the

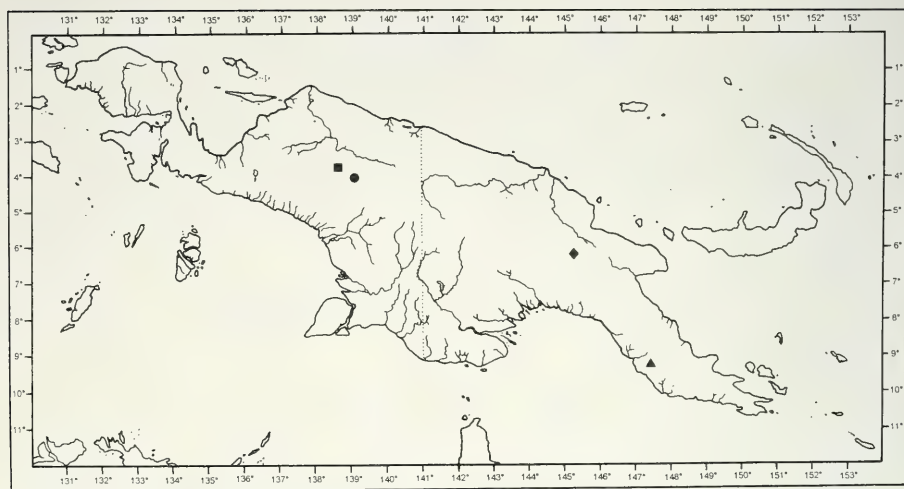


FIG. 33

Distribution of *Guineobius* in New Guinea. (■) *G. niger* sp. n., *G. depressus* sp. n. and *G. baliemensis* sp. n.; (●) *G. minutus* sp. n.; (◆) *G. viduus* Osella; (▲) *G. deharvengei* Osella.

previous locality, but not as wet as usual montane forests in New Guinea. In those other extremely mossy and wet forests good results were never obtained for soil-weevils. It may be that these failures are due to technical problems, since the wet particles stick together and may not get into the sieve or it takes the beetles even longer than in drier material before they start moving and can be seen and collected. But it is possible that the extremely wet mossy forests most common in New Guinea do not meet the ecological requirements of soil-weevils.

Except for the type locality nothing more is known of the distribution of the species. However, we expect that their range is very limited (See also below). Based on this point of view *G. niger*, *G. depressus* and *G. baliemensis* are highly endangered species. The greatest part of the presumably unique weevil fauna of the valley floor probably already has become extinct: In the western part of the highlands of New Guinea the Baliem valley was unique in possessing extensive swamps and gallery forests at an elevation of about 1700m. They have been cleared before arrival of the first explorers (ARCHBOLD *et al.*, 1942); probably these extensive clearings date back as long as 7000 to 5200 years BP (HABERLE *et al.* 1991). Now increasing pressure for fire-wood and land is being exerted on relict forests on the slopes of the valley through the dense and growing population of the fertile valley. Influenced by the favourable climate of the grand valley these relict forests are usually much drier than forests of comparable altitude in other parts of the highlands. For this reason an unique fauna and flora might have developed. To prove this assumption an effective

protection and exploration of these forests is necessary, otherwise they are likely to disappear before we can get sufficient information on their biodiversity.

The record of three sympatric species occurring on one small locality is of some significance. It shows that there must be considerable ecological differentiation in this genus, allowing their coexistence. One difference between *G. niger* and *G. depressus* is rather obvious from their morphology. The flat and ferruginous *G. depressus* seems to be better adapted to a life in deeper litter layers where it would fit between small gaps in the material, whereas *G. niger* with its larger, more convex and black body would be expected to dwell on or a little below the surface of the litter. As a consequence a much greater number of species than is known today can be expected from New Guinea. Within a group of slow-moving, apterous insects a lot of "trivial species" e.g. allopatric species, not very different biologically, with trivial local adaptations (HOLLOWAY, 1990) can be expected in a country as mountainous as New Guinea. Probably the same set of ecological niches could be found in each suitable locality, resulting in a vast number of species.

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